

**Fermilab**

May 30, 1990

MEMO TO: Roger Coombes, Paul Sanger

FROM: Jim Strait

SUBJECT: 40 mm Model Magnet Development Program at Fermilab

Attached is a table showing the characteristics of the planned 40 mm 1 m model magnets. As always, the actual characteristics of future magnets may differ from what is shown, depending on the results from earlier magnets.

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40 MM MODEL MAGNET DEVELOPMENT PROGRAM AT FERMILAB

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	DS0307 <sup>7</sup>	308	309	310	311 <sup>8</sup>	312	313	314	315	316	317	318 <sup>9</sup>
<b>Design Features<sup>1</sup></b>												
Pro-oval collars, horizontally split yoke	X	X	X	X	X	X	X					
Horizontally oval collars, vertically split yoke								X	X	X	X	X
Individually determined coil ends	X	X	X	X	X							
Grouped outer coil ends						X	X	X	X	X	X	X
Teflon on coils	X			X	X							
Improved end clamp <sup>2</sup>										X	X	
<b>Instrumentation<sup>3</sup></b>												
End clamp deflection gages		X				X				X	X	
End clamp strain gages				X		X				X	X	
Skin strain gages		X		X		X		X	X	X		
<b>Test Plan<sup>4</sup></b>												
Mini-life test <sup>5</sup>			X	X					X			
Tests of collaring methods	X				X							
Disassemble after cold test			X					X	X			
Pot and section	X		X	X		X <sup>10</sup>		X	X			
Creep tests <sup>6</sup>				X		X						

## NOTES

- 1 Unless otherwise noted all magnets have the standard Fermilab modifications to the base-line design: individually determined analytically designed coil ends, all Kapton coil insulation system with no collaring shims or shoes, collet end clamp with external inner-outer coil splice.
- 2 The improved end clamp has not been designed in detail but is currently planned to use G10 blocks with transverse fibers and a stainless steel can with increased radial thickness.
- 3 All magnets include, in addition to the instrumentation list in the table, 55 voltage taps, one strain gage collar pack (4 inner and 4 outer coil gages) and "bullet" gages at the return end.
- 4 The standard test plan includes room temperature harmonics measurements with the mole before and after the cold test, room temperature and 4.3 K harmonics measurements with the Lab 2 magnetometer, quench testing at 4.3 K and 3.8 K, strain gage measurements up to the highest fields attained at 4.3 K and 3.8 K and a thermal cycle with 4.3 K quench and strain gage tests repeated on the second cooldown.
- 5 A "mini-life test" consists of 500 excitation cycles between 2000 A and 6500 A at about 100 A/s.
- 6 Creep tests will be carried out at the SSCL and may include only a portion of a partially disassembled or sectioned magnet.
- 7 DS0307 was used only for assembly experiments and was not cold tested.
- 8 DS0311 is intended primarily as a test of assembly experiments and may not be cold tested.
- 9 Depending on the schedule for assembly of the first 50 mm model and the progress of the 40 mm development program, up to two more models beyond DS0318 may be built.
- 10 Ends only to be plotted.